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STUDIES OF PAPUASIAN PLANTS, VI

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*Concluded from page 270*

**Dubouzetia** Pancher

*Dubouzetia* Pancher (ex Brongn. & Gris in Bull. Soc. Bot. Fr. 8: 199. 1861) is now composed of five species, all endemic to New Caledonia, according to the informative revision by Sprague (in Kew Bull. 1907: 125–128. 1907). The differences between *Dubouzetia* and its closest ally, the Chilean *Tricuspidaria* R. & P. (*Crinodendron* Mol., in part), are adequately discussed by Sprague (loc. cit., also op. cit. 10–12).

The discovery of two New Guinean species which indubitably represent *Dubouzetia* is of especial interest and further illustrates the occurrence of certain floristic elements in both the New Caledonian and Papuan regions. *Antholoma*, also of the Elaeocarpaceae, is already known to have a similar distribution (see discussion below under *Sloanea*).

*Dubouzetia novoguineensis* sp. nov.

Arbor ad 14 m. alta partibus juvenilibus sericeo-puberulis inflorescentiisque exceptis glabra, ramulis gracilibus apicem versus angulatis vetustioribus subteretibus lenticellatis; petiolis gracilibus nigrescentibus canaliculatis 5–12 mm. longis; laminis chartaceis in sicco fusco-olivaceis ellipticis, (4–)5–9 cm. longis, 2.5–5.5 cm. latis, basi obtusis et in petiolum decurrentibus, apice obtusis vel rotundatis, margine repando-denticulatis, costa supra elevata subtus prominente, nervis lateralibus utrinsecus 5–7 erecto-patentibus anastomosantibus supra prominulis subtus elevatis, rete venularum copioso utrinque prominulo; inflorescentiis axillaribus vel e ramulis defoliatis ortis breviter racemosis 4–8-floris, pedunculo brevi et rhachi striatis parce puberulis sub anthesi et sub fructu 5–10 mm. longis, bracteis ellipticis puberulis ad 4 mm. longis ante anthesin caducis, pedicellis gracilibus puberulis sub anthesi 15–25 mm. longis sub fructu incrassatis interdum ad 30 mm. longis; sepalis 5 papyraceis oblongo-lanceolatis, 12–14 mm. longis, basim versus 3–4 mm. latis deinde ad apicem subacutum gradatim angustatis, utrinque minute sericeo-puberulis, intus carinatis; petalis 5 membranaceis oblongis, 16–18 mm. longis, 7–8 mm. latis, margine involutis

et basim versus saepe subcohaerentibus, apice rotundatis et obscure 3- vel 4-denticulatis (lobis deltoideis obtusis circiter 0.2 mm. longis), flabellatim paucinervatis et intus inferne inconspicue carinatis, utrinque basim versus et margine parce hirtellis ceterum glabris; disco 10-lobato, lobis carnosus subglobosis circiter 1 mm. diametro superne minute hirtellis; staminibus circiter 31 ubique hispidulo-puberulis 2- vel 3-seriatis, filamentis subteretibus 8-9 mm. longis, antheris 4-4.5 mm. longis; ovario 3-5-loculari subgloboso-ovoideo dense aureo-sericeo, loculis 6-ovulatis, stylo subulato obscure sulcato circiter 12 mm. longo inferne ut ovario sericeo superne glabro; capsulis depresso-subglobosis, 10-15 mm. longis, paullo latioribus, inconspicue sericeo-puberulis, primum ad medium vel fere ad basim loculicide denique perfecte septicide dehiscentibus, epicarpio tenui, endocarpio duro, basi styli persistente fisso, seminibus ut videtur circiter 3 pro loculo ellipsoideis circiter 3 mm. longis castaneis nitidis strophiolatis.

BRITISH NEW GUINEA: Central Division, Mt. Tafa, alt. 2300-2400 m., *Brass* 4041 (A, NY) (small slender weakly branched tree, in mossy-forest; leaves glossy on both sides), *Brass* 4888 (A, NY) (clean-boled tree, common in ridge forests; crown spreading, thin-foliaged; leaves darker and shining above, reddish in age), *Brass* 5059 (A, TYPE, NY), Sept. 17, 1933 (tree 12-14 m. high, common in substage of tall *sama* forest; leaves dark, with pale midrib and nerves; petals cream-colored).

*Dubouzetia novoguineensis* is quite distinct from the known New Caledonian species of the genus, being most suggestive of *D. elegans* Brongn. & Gris, according to Sprague's key (in Kew Bull. 1907: 126. 1907). The new species differs from *D. elegans* in its proportionately broader and apparently thinner leaf-blades, in having its flowers 4-8 on an obvious rachis rather than paired and subfasciculate, and in having its sepals somewhat larger at anthesis and its stamens more numerous.

*Dubouzetia dentata* sp. nov.

Arbor ad 25 m. alta sub fructu ubique infructescentiis exceptis glabra, ramulis gracilibus castaneis apicem versus angulatis inferne subteretibus; petiolis gracilibus canaliculatis 8-13 mm. longis; laminis chartaceis vel subcoriaceis in sicco fusco-olivaceis anguste ellipticis, 8-12.5 cm. longis, 2.5-4.5 cm. latis, basi obtusis, in apicem acutum gradatim angustatis, margine anguste recurvatis et dentibus apiculatis distantibus conspicue crenato-serratis, costa supra elevata subtus prominente, nervis lateralibus utrinsecus 6-9 leviter curvatis supra paullo subtus valde prominulis, rete venularum copioso utrinque prominulo; inflorescentiis sub fructu e ramulis infra folia orientibus vel interdum axillaribus, breviter racemosis, pedunculo brevi et rhachi 4-10 mm. longis demum glabratis, pedicellis sub fructu gracilibus 15-30 mm. longis puberulis vel glabratis; sepalis petalisque non visis; disco persistente 10-lobato, lobis carnosus oblongis circiter 1.2 mm. altis superne hirtellis; staminibus interdum subpersistentibus ut videtur circiter 30 ubique copiose hirtellis, filamentis gracilibus 5-7 mm. longis, antheris 1.7-2 mm. longis; capsulis 2-4 per inflorescentiam apicem rhachis versus ortis, obovoideis, maturitate 16-20 mm. longis et 12-15 mm. latis, basim versus angustatis, apice basi styli persistente fisso coronatis, cano-puberulis demum glabratis, primum parum loculicide denique perfecte septicide dehiscentibus, epicarpio tenui in sicco ruguloso, endocarpio osseo, seminibus paucis ellipsoideis 3-4 mm. longis atro-castaneis strophiolatis.

NETHERLANDS NEW GUINEA: Bele River, 18 km. northeast of Lake Habbema, alt.

2300 m., *Brass* 11251 (TYPE), Nov. 1938 (subsidiary tree 25 m. high in fagaceous forest of slopes; trunk 60 cm. diam.; bark fibrous, fissured).

Although the described collection lacks flowers, the characteristics of the fruit and the available persistent stamens leave no doubt that a species of *Dubouzetia* is represented. *Dubouzetia dentata* is of the general relationship of *D. novoguineensis* (described above), differing in its proportionately narrower and more sharply toothed leaf-blades, its much smaller anthers, and its obovoid fruits, which are gradually narrowed rather than rounded at base. The new species closely resembles the New Caledonian *D. elegans* Brongn. & Gris in leaf-shape and -texture but has the veinlets more obvious on both surfaces and the flowers more numerous; the anthers of *D. elegans* are about 3 mm. long, but apparently the fruits have not yet been described.

### Sloanea L.

The Papuasian species of Elaeocarpaceae with loculicidally dehiscent fruits, a flattened staminiferous torus, and laterally dehiscent anthers not opening at the apex (*Sloanea* sens. lat.) were placed by Schlechter (in Bot. Jahrb. 54: 146–155. 1916) in three genera, *Echinocarpus* Bl., *Anoniodes* Schlechter, and *Antholoma* Labill. The biological validity of these genera can be appraised only by considering groups of this alliance in other parts of the world, including the proposed genera *Echinocarpus* and *Phoenicosperma*.

*Echinocarpus* Bl. (Bijdr. Fl. Ned. Ind. 56. 1825) was based on *E. Sigun* Bl. (loc. cit.), a Javan species with the following essential characters: inflorescences 1-flowered; petals differing from the sepals, toothed at apex; stamens with obvious filaments, awned at apex; ovary pubescent and obscurely muricate, the style moderately long; fruit copiously echinate; aril partial, covering apical portion of the seed only, irregular-margined. This concept is the basis of *Sloanea* § *Echinocarpus* F. v. Muell. ex K. Schum.

*Phoenicosperma* Miq. (in Ann. Mus. Bot. Lugd.-Bat. 2: 68. t. 3. 1865) was based on *P. javanicum* Miq. (loc. cit.), with the following essential characters: inflorescence few-flowered, racemose or paniculate; petals sepaloid in texture, shape, and size; stamens with distinct filaments and awned anthers; ovary velutinous, not muricate, the style moderately long; fruit thick-walled, closely pubescent but not echinate; seeds nearly completely enveloped in an aril, this eventually irregular-margined along one side (ex descr. et icon. Miq.) but probably covering young seeds completely except for the hilar area. *Sloanea* § *Phoenicospermum* K. Schum. is based upon this concept.

An examination of the Malaysian and continental Asiatic species of this alliance indicates that many of them fall into the concept typified by *Echinocarpus Sigun*, while others have the fruit non-echinate like that of *Phoenicosperma*; some have the petals sepaloid and others have them dentate, while many have the anthers essentially erostrate. These characters are found in diverse combinations, to such a degree that the limits

of *Echinospermum* and *Phoenicosperma*, as genera, are no longer useful. Further to complicate the picture, certain Australian species, such as *Sloanea Macbrydei* F. v. Muell. and *S. Woollsii* F. v. Muell., lack petals altogether.

There remains to be considered the possible separation of the Old World species of this alliance (as *Echinocarpus*) from *Sloanea*, which is based on *S. dentata* L., a West Indian species, pertaining to which the discussions of Urban (in Rep. Sp. Nov. 15: 321. 1918, and in Notizbl. Bot. Gart. Berlin 8: 27. 1921) are of importance. The American species of *Sloanea* are as diverse as their Old World relatives, having the fruit either echinate or not, the stamens with filaments of various lengths and with anthers either awned or not, and the flowers usually in open clusters but sometimes essentially fasciculate or even solitary. Petals are apparently lacking among the American species except in *S. jamaicensis* Hook. (Ic. Pl. 7: pl. 693–696. 1844). In view of this diversity, no single character nor any combination of characters will serve to separate the New and Old World species into two different genera. This is the prevailing viewpoint, adopted by K. Schumann (in E. & P. Nat. Pfl. III. 6: 5. 1890). However, Schumann's division of *Sloanea* into three sections, § *Eusloanea*, § *Echinocarpus*, and § *Phoenicospermum*, does not seem adequate, the genus being far more complex than such a division suggests. It is probable that a monographer of the group will erect many more sections, each based upon a combination of characters. None of Schumann's sections, in the narrow sense, occurs in Papuasias.

Support for a comprehensive concept of *Sloanea* is indicated by the treatments of Baillon (Hist. Pl. 4: 190–191. 1873), Szyszyłowicz (in Bot. Jahrb. 6: 454. 1885), Koorders & Valetton (Bijdr. Boom. Java 1: 235–240. 1894), F. M. Bailey (Queensl. Fl. 1: 159–160. 1899), Gagnepain (in Lecomte, Fl. Gén. Indo-Chine 1: 562–564. 1910), Rehder & Wilson (in Sargent, Pl. Wils. 2: 361–362. 1915), and the majority of other students who have considered the group.

Contrary opinions, however, are expressed by Bentham (in Jour. Linn. Soc. Bot. 5: Suppl. 2: 62–74. 1861), Bentham & Hooker (Gen. Pl. 1: 238–239. 1862, and 987. 1867), Masters (in Hook. f. Fl. Brit. Ind. 1: 399–400. 1874), and Schlechter (in Bot. Jahrb. 54: 146–154. 1916). Schlechter proposed to segregate the Old World *Echinocarpus* from the American *Sloanea* on the basis of the following characters: the flowers of *Echinocarpus* are solitary and those of *Sloanea* clustered; the stamens are more numerous in *Echinocarpus*; the style is entire in *Echinocarpus* and 3–5-parted in *Sloanea*; and the aril of the seeds in *Echinocarpus* is lacerated and in *Sloanea* entire. However, none of these characters is dependable, various combinations of them being found in both hemispheres.

While the generic value of *Antholoma* appears not to have been questioned, I am unable to separate this genus from *Sloanea*. It is, in fact, very closely related to the section of *Sloanea* which I describe below as § *Pachycarpaea*, while these two sections are comparatively remote from other Papuasian sections. Thus it is undesirable to retain *Antholoma* as a genus unless the concept of *Sloanea* is broken up into numerous genera,

perhaps a dozen or two, a course which seems unwise in view of the complicated and reticulate inter-specific relationships within the group.

The Papuan species of *Sloanea* fall into four natural groups, which are designated as sections, as follows:

Petals essentially similar to sepals in texture, shape, and size, not dentate at apex; stamens with short scarcely differentiated filaments, the anthers with short obtuse or subacute apices, essentially erostrate; ovary muricate as well as pubescent, the processes often minute and hidden by tomentum at anthesis; style comparatively short, often subconical, eventually deeply divided; seeds nearly completely enveloped by the aril.

Inflorescence racemose, several- or many-flowered, usually axillary, sometimes terminal on short branchlets and with the lower flowers solitary in leaf-axils; stamens all fertile; ovary muricate with obtuse or acute non-plumose processes; fruit copiously echinate with stiff sharp persistent non-irritant spines; aril extending nearly to the hilum, irregular- or subentire-margined. . . . . § *Anoniodes*.

Inflorescence axillary, 1-flowered, the peduncle and pedicel subcontinuous, articulate; fertile stamens surrounded by numerous linear staminodes; ovary muricate with stout hair-like processes which are copiously plumose distally; fruit covered with stiff slender plumose irritant spines, these at length more or less caducous, leaving the fruit-surface setose with smaller simple hairs or at length glabrous and finely pitted (pits indicating attachment of irritant spines); aril essentially complete except for the hilar scar. . . . . § *Cnidocarpaea*.

Petals differing from sepals in texture, shape, and size, dentate at apex; stamens all fertile, with obvious filaments and long-awned anthers; ovary velutinous or tomentellous with simple hairs, not muricate; style elongate, subulate, subentire or at length apically divided; fruit smooth, velutinous or tomentellous, not echinate, at length subglabrescent but then not pitted; aril partial, covering the apical portion of the seed and extending downward along one side nearly to the hilum.

Inflorescence short-racemose, few- or rarely 1-flowered; petals 4-6, rarely more, essentially equal in width, not plicate, free or very rarely subconnate; aril thick and waxy even when dried, the lateral flange linear-oblong, very gradually tapering. . . . . § *Pachycarpaea*.

Inflorescence usually 1-flowered (in Papuan species), the peduncle and pedicel subcontinuous and obscurely articulate; petals plicate distally, connate into a corolla, rarely free and 2-4 in number (equal in width if 2, of diverse widths if 3 or 4); aril thin and papyraceous when dried, the lateral flange essentially triangular, abruptly tapering. . . . . § *Antholoma*.

Because of the transfer to *Sloanea* of the species of this alliance proposed by Schlechter and other students, the nomenclature of the Papuan species is inevitably somewhat complicated. Therefore I list all the known species of the region, although material of some of them is not available. Seventeen species of *Sloanea*, most of which were proposed under other genera, are thus far described from Papua, to which number I add 12 new species below.

#### § ANONIODES

*Sloanea* § *Anoniodes* (Schlechter) comb. nov.

*Anoniodes* Schlechter in Bot. Jahrb. 54: 149. 1916.

In founding *Anoniodes* upon nine endemic New Guinean species, Schlechter contrasts it with *Echinocarpus*, from which it is said to differ in having its inflorescences racemose rather than 1-flowered, its petals sepaloid, its stamens differently shaped and with a short scarcely differentiated filament, and its style shorter. Although these characters are

indeed noteworthy, they hardly seem of generic value in this complex group, as discussed above. No genotype was designated for *Anoniodes*, an oversight of little consequence, but in order to clarify any future discussion I should like to designate as the lectotype of § *Anoniodes* a well-known species of which ample material is available, *Sloanea Nymanii* K. Schum.

The differences between § *Anoniodes* and the other Papuan sections are noted in the above key. From § *Echinocarpus*, § *Anoniodes* differs in its sepaloid petals, short filaments and essentially erostrate anthers, and its nearly complete rather than apical aril. From § *Phoenicospermum*, § *Anoniodes* differs in its short filaments and essentially erostrate anthers, its muricate ovary, and its copiously echinate rather than smooth capsules.

The only New Guinean species described since 1916 which is referable to § *Anoniodes* is *S. sogerensis* Bak. f., discussed below as the acceptable binomial for *Anoniodes sterculiacea* Schlechter. With the addition of the five species herewith described as new, the section is now composed of 14 species.

*Sloanea* (§ *Anoniodes*) *Nymanii* K. Schum. in K. Schum. & Lauterb. Nachtr. Fl. Deutsch. Schutzgeb. Südsee 314. 1905; Bak. f. in Jour. Bot. 61: Suppl. 5. 1923.

*Anoniodes Nymanii* Schlechter in Bot. Jahrb. 54: 150. 1916.

NORTHEASTERN NEW GUINEA: Morobe District, Sattelberg, alt. 900–1000 m., *Clemens 501* (tree 15–18 m. high; seeds scarlet), *Clemens 1973* (tree 15–18 m. high, along forest trail); in den Wäldern oberhalb der Kaulo-Etappe, alt. about 1000 m., *Schlechter 17189* (UC) [det. Schlechter]. BRITISH NEW GUINEA: Central Division, Bella Vista, alt. 1450 m., *Brass 5456* (A, NY) (profusely flowering tree 20 m. high, in forest below oak formations; leaves pale, with whitish nerves; flowers cream-colored; seeds red).

*Clemens 501* and *1973*, both in fruit, are from the type locality. *Brass 5456* also bears fruit and has mature inflorescences. Neither the fully mature flowers nor the fruits appear to have been described, and therefore the following notes seem desirable:

Inflorescences axillary or terminal on short branchlets, at maturity often up to 11 cm. long and 10–20-flowered, the lower flowers subtended by reduced leaves; pedicels at anthesis 10–17 mm. long, to 20 mm. long in fruit; sepals 4, up to 6 × 4 mm.; petals 4, resembling the sepals or slightly longer; torus about 2.5 mm. in diameter, the stamens 3- or 4-seriate, 50–55 (*Brass 5456*) to about 86 (*Schlechter 17189*), 2.5–3 mm. long, the filaments inconspicuous; ovary subglobose, hispid-pilose and densely muricate, the stylar column conical, stout, 1–1.3 mm. long, deeply 3- or 4-divided, the locules 3 or 4 (probably rarely 2), each 6-ovulate; capsule ellipsoid, at maturity 17–28 mm. long and 13–23 mm. broad before dehiscence, 3- or 4- or rarely 2-valved, the pericarp woody, 2–3 mm. thick, closely tomentellous-puberulent, densely echinate, the spines conical, 2–4 mm. long, glabrescent distally; seeds few or often only 1 per capsule, oblong-ellipsoid, 10–17 mm. long, 5–8 mm. broad, nearly completely covered by the aril, this undulate- or subentire-margined near the hilum.

*Sloanea* (§ *Anoniodes*) *glabra* (Schlechter) comb. nov.

*Anoniodes glabra* Schlechter in Bot. Jahrb. 54: 150. 1916.

Reported only from the type collection, *Ledermann 9107*, "Im dichten Höhenwalde auf dem Etappenberg, ca. 850 m.," Northeastern New Guinea.

*Sloanea* (§ *Anoniodes*) *aculeata* sp. nov.

Arbor ad 25 m. alta, ramulis robustis subteretibus rugulosis apicem versus sub fructu cano-puberulis demum subglabratis; petiolis gracilibus subteretibus 8–25 mm. longis ut ramulis puberulis glabrescentibusque; laminis coriaceis in sicco fuscis elliptico- vel paullo obovato-oblongis, (5–)8–13 cm. longis, (2.5–)3.5–7 cm. latis, basi anguste subcordatis vel truncatis et inconspicue quinquenerviis, apice acutis et interdum cuspidatis vel rotundatis apiculo parvo ornatis, margine inconspicue crenatis, supra costa interdum puberula excepta glabris, subtus primo nervis venulisque molliter cano-hirtellis demum glabrescentibus, costa supra impressa vel in sulculo leviter elevata subtus prominente, nervis lateralibus utrinsecus 4–7 erecto-patentibus supra leviter impressis subtus valde elevatis, rete venularum intricato supra paullo subtus saepe valde prominulo; ramulis ut videtur in inflorescentiam terminalem transeuntibus, rhachi ramulis simili ad 6 cm. longa saepe brevior ut videtur pluriflora; fructibus paucis saepe in axillis foliorum apicem ramulorum versus solitariis, pedicellis sub fructu robustis 3–5.5 cm. longis puberulis glabrescentibusque; capsulis subgloboso-ellipsoideis maturitate 3–4 cm. longis paullo angustioribus, dense puberulis atque spinis crassis subulatis 8–15 mm. longis puberulis copiose ornatis, demum basibus spinarum irregulariter tuberculatis, 4- vel raro 5-valvatis; stylo crasso subulato ad 15 mm. longo mox caduco vel basi subpersistente cum valvis fisso; pericarpio lignoso spinis exceptis basim versus circiter 10 mm. superne 4–5 mm. crasso; seminibus in quoque loculo ut videtur circiter 4 ellipsoideis, 9–14 mm. longis, 5–8 mm. latis, fere totis arillo hilum versus sinuato-marginato arcte oclusis, arillo demum hinc inde caduco, testa glauco-nigrescente.

NETHERLANDS NEW GUINEA: 2 km. southwest of Bernhard Camp, Idenburg River, alt. 850 m., *Brass & Versteegh 13529* (TYPE), Apr. 1, 1939 (tree 25 m. high, frequent in primary rain-forest on a ridge; trunk 58 cm. diam.; crown not wide-spreading; bark 16 mm. thick, gray, shallowly fissured; wood red-brown; fruits yellow-brown); 6 km. southwest of Bernhard Camp, alt. 1200 m., *Brass & Versteegh 13104* (tree 21 m. high, rare in primary forest on a ridge; trunk 44 cm. diam.; crown fairly small; bark 6 mm. thick, brown, scaly, fairly rough; sap-wood white; heart-wood red; fruits red).

The specimen indicated as the type bears fully mature fruits and has the leaves essentially glabrous, while no. *13104* has younger fruits and the leaves still pubescent on the nerves and veinlets beneath. The closest relative of *S. aculeata* is probably *S. glabra* (Schlechter) A. C. Sm., which is more completely glabrous in habit and has longer petioles and a larger 3-valved fruit with fewer seeds.

*Sloanea* (§ *Anoniodes*) *Pullei* sp. nov.

Arbor ad 28 m. alta, ramulis robustis subteretibus apicem versus 5–10 mm. diametro mox glabris; stipulis parvis 1–2 cm. diametro foliaceis sessilibus basi cordatis mox caducis; petiolis crassis subteretibus (2.5–)3–8 cm. longis primo puberulis glabrescentibus; laminis chartaceo-coriaceis siccitate fuscescentibus late oblongo-ellipticis, (12–)17–33 cm. longis, (7–)10–20 cm. latis, basi rotundato-truncatis vel leviter cordatis et 7-nerviis, apice obtusis vel rotundatis et minute mucronulato-cuspidatis, margine irregulariter spinuloso-crenulatis, utrinque glabris vel nervis evanescenter puberulis, costa valida supra elevata subtus prominente, nervis e basi orientibus utrinsecus 3 rectis haud conspicuis, nervis laterali-

bus e costa utrinsecus 6–9 adscendentibus supra elevatis subtus prominentibus, eis basim versus nervulos conspicuos inferne emittentibus, rete venularum copioso utrinque plus minusve prominulo; inflorescentiis racemosis axillaribus 11–19 (sub fructu ad 23) cm. longis 15–20-floris, pedunculo conspicuo (rhachem subaequali) et rhachi leviter angulatis sub anthesi cum bracteis pedicellisque dense tomentello-puberulis sub fructu incrassatis et glabrescentibus, bracteis lanceolatis 4–5 mm. longis mox caducis, pedicellis sub anthesi gracilibus 12–15 mm. longis; sepalis 4 papyraceo-subcoriaceis elliptico-oblongis, 7–8 mm. longis, 3.5–4 mm. latis, subacutis, utrinque cano-puberulo-tomentellis; petalis 4 sepalis similibus sed ad 4.5 mm. latis; toro ad 3 mm. diametro; staminibus circiter 50 plerumque 3-seriatis circiter 3.5 mm. longis, filamentis carnosis glabris 0.5–1 mm. longis, antheris curvatis dorso obscure hispidulis apiculo glabro circiter 1 mm. longo exeuntibus; ovario ovoideo 4-angulato 4-loculari pilis stramineis circiter 0.3 mm. longis dense hispido atque obscurissime muricato, loculis 10-ovulatis, stylo crasso conico circiter 1.5 mm. longo superne glabro apice obscure 4-fido; pedicellis sub fructu valde incrassatis ad 2 cm. longis; capsulis maturis ellipsoideis 4–5 cm. longis paullo angustioribus, persistenter cano-puberulis atque spinis subulatis ad 10 mm. longis (mox interruptis) ornatis, demum basibus spinarum tuberculatis, 4- vel raro 3-valvatis; pericarpio lignoso 9–10 mm. crasso; seminibus in quoque loculo ut videtur 4–6 ellipsoideis, 12–15 mm. longis, 5–7 mm. latis, fere totis arillo hilum versus subintegro-marginato oclusis.

NETHERLANDS NEW GUINEA: Mt. Perameles, alt. 1100 m., *Pulle 519* (TYPE), Dec. 1, 1912; 4 km. southwest of Bernhard Camp, Idenburg River, *Brass & Versteegh 13135* (tree 28 m. high, occasional in primary rain-forest on the slope of a ridge; trunk 44 cm. diam.; crown not wide-spreading; bark 8 mm. thick, gray, fairly rough; sap-wood light yellow; heart-wood red-brown; fruits light brown).

The specimen designated as the type bears flowers and has been indicated by Dr. O. C. Schmidt to be a new species, with the specific epithet selected above; apparently Schmidt's binomial has not been published. Mt. Perameles lies to the south of Mt. Wilhelmina and consequently on the other side of the main range from the Idenburg River locality. The Brass and Versteegh specimen bears fruits and in foliage is essentially identical with the type.

*Sloanea Pullei* appears to be most closely related to *S. glabra* (Schlechter) A. C. Sm. and *S. aculeata* (above described), from both of which its much larger leaves and its elongate axillary inflorescences immediately distinguish it.

*Sloanea* (§ *Anoniodes*) **micrantha** nom. nov.

*Anoniodes parviflora* Schlechter in Bot. Jahrb. 54: 151. 1916; non *Sloanea parviflora* Planch. ex Benth., 1861.

Known only from the original collection, *Ledermann 10369*, "Im lichten Bergwalde auf dem Lordberg, ca. 1000 m.," Northeastern New Guinea.

*Sloanea* (§ *Anoniodes*) **brachystyla** (Schlechter) comb. nov.

*Anoniodes brachystyla* Schlechter in Bot. Jahrb. 54: 151. 1916.

Reported only from the type collection, *Ledermann 10356*, "Im montanen Walde auf dem Lordberg, ca. 1000 m.," Northeastern New Guinea.

*Sloanea* (§ *Anoniodes*) **Schumanni** Warb. in Bot. Jahrb. 13: 372. 1891; K. Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee 433 (as *S. Schumannii*), 1901; Bak. f. in Jour. Bot. 61: Suppl. 5. 1923.



*Anoniodes Schumannii* (sic) Schlechter in Bot. Jahrb. 54: 151. 1916.

The type was collected by Warburg (presumably no. 20023) near Finschhafen, Northeastern New Guinea. Two other collections from the same general region are cited by Schlechter, and Baker lists a collection from Sogere, British New Guinea.

*Sloanea* (§ *Anoniodes*) *speciosa* sp. nov.

Arbor, ramulis gracilibus subangulatis apicem versus 2–3 mm. diametro crispato-hispidulis mox glabratis; stipulis inconspicuis lanceolatis ad 1 cm. longis interdum in laminam minutam expansis mox caducis; petiolis gracilibus subteretibus 1.5–4 cm. longis ut ramulis hispidulis et glabrescentibus; laminis papyraceo-chartaceis oblongo-ellipticis, maturis 10–16 cm. longis et 4.5–7 cm. latis, basi anguste subcordatis vel rotundato-truncatis et inconspicue 5-nerviis, apice acutis vel breviter mucronulato-cuspidatis, margine dentibus 1 vel 2 per centimetrum calloso-crenulatis, supra costa interdum puberulis, subtus costa nervisque laxe crispato-pilosis, ceterum glabris, demum omnino glabrescentibus, costa supra subplana subtus prominente, nervis lateralibus e costa utrinsecus 5–8 rectis adscendentibus supra impressis subtus valde elevatis, rete venularum intricato utrinque prominulo; inflorescentiis racemosis axillaribus vel terminalibus (ramulis in inflorescentiam transeuntibus, floribus interdum in axillis foliorum solitariis) 8–12 cm. longis plerumque 6–12-floris, pedunculo conspicuo et rhachi mox glabratis, bracteis linearibus hirtellis 1–2 cm. longis interdum foliaceis demum deciduis; pedicellis gracilibus sub anthesi 3–5 cm. longis copiose et pallide tomentellis; sepalis 4 papyraceis late ovato-ellipticis, 12–15 mm. longis, 7–9 mm. latis, subacutis, utrinque dense tomentello-puberulis; petalis 4 textura et indumento sepalis similibus, intus basim versus subglabratis, lanceolato-oblongis, 16–18 mm. longis, 5–7 mm. latis, subacutis; toro circiter 5 mm. diametro; staminibus circiter 110 valde falcatis 4- vel 5-seriatis 6–7 mm. longis, filamentis carnosis complanatis 1.5–2 mm. longis, antheris dorso sericeo-hispidulis apiculo acuto glabro 1–1.5 mm. longo exeuntibus; ovario ovoideo 4-loculari pilis simplicibus stramineis circiter 2 mm. longis dense hispido atque processibus circiter 0.15 mm. longis occultis obscure muricato, loculis circiter 16-ovulatis, stylo carnosissimo subulato circiter 5 mm. longo leviter sulcato apice obscure 4-fido.

NORTHEASTERN NEW GUINEA: Morobe District, Quembung, alt. about 750 m., *Clemens 1189* (TYPE), Dec. 12, 1935.

From *S. Schumannii* Warb., apparently its closest ally, *S. speciosa* is readily distinguished by the sparse rather than copious indument of its petioles and leaf-nerves, its smaller leaf-blades, its sometimes terminal inflorescence with the flowers often solitary in leaf-axils, and its much longer pedicels. Mature floral dimensions have not been given for *S. Schumannii*, but the bud is presumably about the size of that of the new species.

*Sloanea* (§ *Anoniodes*) *sogerensis* Bak. f. in Jour. Bot. 61: Suppl. 6. 1923.

*Anoniodes sterculiacea* Schlechter in Bot. Jahrb. 54: 152. 1916; O. C. Schmidt in Jour. Arnold Arb. 10: 237. 1929; non *Sloanea sterculiacea* Rehder & Wilson, 1915.

NETHERLANDS NEW GUINEA: 6 km. southwest of Bernhard Camp, Idenburg River, alt. 1250 m., *Brass & Versteegh 12529* (tree 25 m. high, occasional in primary forest on a ridge; trunk 50 cm. diam.; crown not wide-spreading; bark 8 mm. thick, gray, fairly smooth; sap-wood light rose; heart-wood red-brown; fruits brown-yellow). NORTHEASTERN NEW GUINEA: Morobe District: Sattelberg, alt. 750–1050 m., *Clemens 1854*

(large tree, in forest; trunk more than 1 m. diam.; fruit yellow-gray), *Clemens 1899* (tree, in forested hills; trunk 45–60 cm. diam.; fruit gray-green), *Clemens 3103*; Bulung River, alt. about 900 m., *Clemens 5334*; Boana, alt. 750–1350 m., *Clemens 41805* (large tree; seeds scarlet). BRITISH NEW GUINEA: Central Division: Iawarere, alt. about 350 m., *Brass 691* (large straight-boled tree, with brittle corky bark and pale hard wood); Mafulu, alt. 1250 m., *Brass 5210* (A, NY) (large tree, in tall forest of mountain-slopes; crown dense, thickly branched; fruit pale yellow, the seeds orange-red).

*Anoniodes sterculiacea* was based on *Ledermann 9581*, "In dichtem Höhenwald auf dem Etappenberge, ca. 850 m.," Northeastern New Guinea; the specific epithet is not available in *Sloanea*. *Sloanea sogerensis* is typified by four collections of Forbes, from Sogere, Central Division, British New Guinea. A comparison of the two original descriptions indicates that the same species was under consideration, characterized by large and subpersistent stipules, large leaf-blades which are persistently hirtellous beneath, and elongate inflorescences. *Sloanea sogerensis* is described as having longer petioles and pedicels than *Anoniodes sterculiacea*, but in the series of specimens cited above I find the petioles to vary from 2 to 8 cm. and the pedicels from 1 to 3.5 cm. in length, indicating that these characters are variable. The racemes are often elongated to 30 cm. in fruit. The flowers are predominantly 4-merous (sepals said to be commonly 3 in *Anoniodes sterculiacea*), the stamens about 200 and 5- or 6-seriate, the capsule at maturity subglobose, 3–4 cm. in diameter, usually 4-valved, copiously covered with spines 6–12 mm. long, and the seeds are few, often only 1 per locule, large (up to 18 × 9 mm.), and nearly completely arillate.

*Sloanea* (§ *Anoniodes*) *oxyacantha* sp. nov.

Arbor ad 17 m. alta, ramulis subteretibus apicem versus 3–5 mm. diametro dense brunneo-tomentello-puberulis inferne demum subglabrescentibus; stipulis saepe subpersistentibus textura foliaceis suborbicularibus sessilibus basi cordatis 6–12 (–25) mm. diametro; petiolis robustis subteretibus ut ramulis tomentellis (1.5–)3–6.5 cm. longis; laminis chartaceo-coriaceis in sicco fuscis deltoideo-ovatis vel -ellipticis, (8–)12–24 cm. longis, (5–)7–13.5 cm. latis, basi profunde cordatis et 7- vel raro 5-nerviis, apice acutis et calloso-apiculatis, margine dentibus 1 vel 2 per centimetrum calloso-apiculatis crenulatis, supra costa nervisque copiose hispidulis et rete venularum interdum pilifero exceptis glabris, subtus molliter et breviter hirtellis, costa supra leviter subtus valde prominente, nervis lateralibus e costa utrinsecus 6–9 erecto-patentibus supra leviter elevatis subtus prominentibus, eis basim versus nervulos paucos inferne emittentibus, rete venularum intricato utrinque prominulo; inflorescentiis sub fructu axillaribus racemosis 3–8 cm. longis, pedunculo subnullo, rhachi crassa subtereti pedicellisque ut ramulis puberulis demum subglabrescentibus; fructibus paucis, pedicellis 11–17 mm. longis; capsulis subglobosis spinis exclusis ad 1 cm. diametro, dense puberulis atque spinis crassis subulatis 8–12 mm. longis copiose obtectis, ut videtur interdum 2-valvatis (apertis non visis), stylo brevi inconspicuo coronatis, pericarpio 2–3 mm. crasso; seminibus ut videtur interdum solitariis, fere totis arillo oclusis.

NETHEPLANDS NEW GUINEA: 15 km. southwest of Bernhard Camp, Idenburg River, alt. 1700 m., *Brass & Versteegh 11924* (tree 17 m. high, frequent in rain-forest of upper slopes; trunk 39 cm. diam.; crown not wide-spreading; bark 5 mm. thick, brown; wood

rose-colored; fruits brown-yellow), *Brass* 12045 (TYPE), Jan. 1939 (tree 4 m. high, one specimen seen in undergrowth of a rain-forest gully).

Although known only from the two cited fruiting specimens, *S. oxyacantha* is obviously most closely related to *S. sogerensis* Bak. f., which it resembles in its stipules and in the texture, shape, pubescence, and venation of its leaf-blades. The leaf-blades of the new species are inclined to be more deltoid-ovate than elliptic-ovate in shape, while in fruit the two species are quite different. *Sloanea oxyacantha* has the inflorescence much more compact and short-pedunculate, while the capsules are short-pedicellate and much smaller, with correspondingly fewer spines.

*Sloanea* (§ *Anoniodes*) *Ledermannii* nom. nov.

*Anoniodes rufa* Schlechter in Bot. Jahrb. 54: 152. f. 9, H-M. 1916; non *Sloanea rufa* Planch. ex Benth., 1861.

Recorded only from the type collection, *Ledermann* 12616, "Im Gebirgswalde bei dem Lager 'Felsspitze' ca. 1400-1500 m.," Northeastern New Guinea.

*Sloanea* (§ *Anoniodes*) *pulchra* (Schlechter) comb. nov.

*Anoniodes pulchra* Schlechter in Bot. Jahrb. 54: 153. f. 9, A-G. 1916; Lane-Poole, Rep. For. Res. Papua 110. 1925; White & Francis in Proc. Roy. Soc. Queensl. 39: 64. 1928.

The type was collected by Ledermann (no. 9267), "In dichtem Höhenwalde auf dem Etappenberg, ca. 850 m.," Northeastern New Guinea. Lane-Poole and White and Francis refer here a collection by Lane-Poole from the Finschhafen district.

*Sloanea* (§ *Anoniodes*) *Clemensiae* sp. nov.

Arbor, ramulis hornotinis leviter angulatis 3-4 mm. diametro dense fulvo-villosis, annotinis subglabratis striatis fusco-cinereis; petiolis validis ut ramulis juvenilibus dense villosis subteretibus 12-17 mm. longis; laminis chartaceis in sicco atro-brunneis late ellipticis, (7-)10-15 cm. longis, (5-)7-10 cm. latis, basi rotundatis vel anguste subcordatis et inconspicue 5-nerviis, apice acutis et calloso-apiculatis, margine dentibus 1 vel 2 per centimetrum inconspicue calloso-crenulatis, supra costa nervisque fulvo-hispidulis exceptis glabris, subtus pilis pallidis mollibus persistenter hirtellis, costa supra leviter elevata subtus prominente, nervis lateralibus e costa utrinsecus 4-6 erecto-patentibus supra subplanis subtus valde elevatis, rete venularum intricato utrinque prominulo; inflorescentiis axillaribus vel terminalibus (ramulis in inflorescentiam gradatim transeuntibus, floribus inferne in axillis foliorum solitariis) 9-12 cm. longis 8-15-floris, rhachi pedicellisque ut ramulis dense villosis, bracteis linearibus villosis ad 15 mm. longis vel foliaceis mox caducis, pedicellis sub anthesi 4-4.5 cm. longis; floribus paullo ante anthesin solis visis; sepalis 4 subcoriaceis ovatis circiter 10 × 7 mm., acutis, extus hispidulo-tomentellis, intus arcte cano-sericeis; petalis sepalis subsimilibus, ovato-ellipticis, circiter 9 × 6 mm., subacutis, extus tomento denso sericeo obtectis, intus arcte sericeis; toro carnoso circiter 6 mm. diametro pilis stramineis circiter 1 mm. longis dense hispido; staminibus circiter 90 pluriseriatis 6-7 mm. longis, filamentis carnis complanatis 0.5-1.3 mm. longis, antheris oblongo-falcatis dorso pilis stramineis circiter 0.5 mm. longis dense hispido-sericeis apiculo carnoso obtuso 1 mm. longo exeuntibus; ovario 4-loculari pilis stramineis simplicibus 1.5-2 mm. longis dense hispidulo atque processibus circiter 0.25 mm. longis occultis copiose muricato, loculis 14-ovulatis, stylo carnoso conico 4-sulcato circiter 3 mm. longo basi tomento occulto apice

4-fido; capsulis maturis ellipsoideis 2.5–3.5 cm. longis, persistenter strigulosis atque spinis subulatis ad 10 mm. longis puberulis ornatis, ut videtur 4-valvatis, pericarpio lignoso 2–3 mm. crasso, seminibus non visis.

NORTHEASTERN NEW GUINEA: Morobe District, Ogeramnang, alt. about 1700 m., *Clemens 4900* (TYPE), Jan. 9, 1937.

*Sloanea Clemensiae* is most closely related to *S. pulchra* (Schlechter) A. C. Sm., from which it differs in its shorter-petiolate leaf-blades, which are glabrous rather than velutinous above, its longer pedicels, its probably smaller flowers, and its 4- rather than 5-merous perianth and ovary (probably not a very important character). In the terminal inflorescences of *S. Clemensiae* the branchlets pass imperceptibly into the rachis, and the lower flowers are solitary in leaf-axils. This flowering habit occurs in some other species of § *Anoniodes* and indicates that it is not of primary consequence whether the flowers are solitary and axillary or aggregated into racemes.

*Sloanea* (§ *Anoniodes*) *velutina* (Schlechter) comb. nov.

*Anoniodes velutina* Schlechter in Bot. Jahrb. 54: 154. 1916.

Known only from the original collection, *Ledermann 12014*, "In bemoostem Gebirgswalde auf dem Schraderberge, ca. 2070 m.," Northeastern New Guinea.

#### § CNIDOCARPAEA

*Sloanea* § *Cnidocarpacea* sect. nov.

Sectio *Sloaneae* petalis textura et apice sepalis similibus, staminibus staminodiisque numerosissimis (circiter 250–275), staminodiis linearibus, staminibus apiculo brevi crasso exeuntibus, ovario setuloso et processibus plumosis muricato, fructibus spinas numerosas breves urentes gerentibus, seminibus arillo omnino obtectis distinguitur. Arbores, inflorescentiis axillaribus 1-floris, pedunculo et pedicello subcontinuis articulatis; petalis quam sepalis paullo longioribus vel subsimilibus subacutis; staminodiis circiter 90–100, staminibus intra staminodia circiter 160–180, filamentis brevibus; ovario 3- vel 4-loculari, loculis 10–20 (vel ultra?) -ovulatis, stylo crasso conico brevi profunde fisso; capsulis magnis 3- vel 4-valvatis, valvis lignosis densissime et breviter plumoso-spinosis atque minute setulosis; seminibus 6–20 in quoque loculo, arillo praeter hili cicatricem omnino oclusis.

The sectional name is compounded from the Greek words for nettle and fruit, referring to the fact that the capsules are covered by irritant plumose hair-like bristles, which are readily caducous and extremely unpleasant to the touch. To the two already known species of New Guinea which are referable to this section, I add one new species below. *Sloanea Brassii* (O. C. Schmidt) A. C. Sm. is herewith designated as the type species of § *Cnidocarpacea*.

The new section is very distinct and is readily distinguished from the other Papuan sections as pointed out in the key above. In having its numerous stamens surrounded by sterile staminodial organs and in its fruit-indument, § *Cnidocarpacea* is unlike the other described sections of *Sloanea*. In the general characters of its petals, stamens, and aril, § *Cnidocarpacea* resembles § *Anoniodes*, while its thick-walled capsules in texture resemble those of § *Pachycarpacea* and § *Antholoma*. The new

section differs obviously from § *Echinocarpus* in characters pertaining to its petals, stamens, staminodes, ovary- and fruit-indument, and aril; from § *Phoenicospermum* it differs in its simple inflorescence, its stamens, staminodes, and ovary- and fruit-covering.

*Sloanea* (§ *Cnidocarpacea*) *Brassii* (O. C. Schmidt) comb. nov.

*Sloanea paradisearum* sensu F. M. Bailey in Queensl. Agr. Jour. 22: 147. pl. 24. 1909; Lane-Poole, Rep. For. Res. Papua 111 (*S. paradisiarum*). 1925; non F. v. Muell.

*Echinocarpus Brassii* O. C. Schmidt in Jour. Arnold Arb. 10: 79, 237. 1929.

BRITISH NEW GUINEA: Bisiatabu, in foothill forest, alt. 450 m., *Brass 619* (TYPE COLL.) (handsome buttressed tree 18 m. high; bark thin, rough, brown; wood pale; sepals pink; petals white). NETHERLANDS NEW GUINEA: Bernhard Camp, Idenburg River, alt. 75 m., *Brass & Versteegh 13551* (tree 21 m. high, occasional in primary rain-forest on lower mountain-slopes; trunk 43 cm. diam.; crown fairly small; bark 6 mm. thick, fairly rough; wood red-brown; fruits red), *Brass & Versteegh 14002* (tree 24 m. high, rare in primary rain-forest on lower mountain-slopes; trunk 48 cm. diam.; crown not wide-spreading; bark 14 mm. thick, black; sap-wood brown; heart-wood black; flowers white); ? *Hollandia, Neth. Ind. For. Serv. 28927* [sterile].

The cited specimens are very uniform and offer ample material for study. Although the original description is in general adequate, several important features are omitted, making desirable the following amplification:

Leaves more or less persistently puberulent on petiole and principal nerves of lower surface; petioles 15–40(–65?) mm. long; leaf-blades papyraceous or chartaceous, dark brown when dried, obovate-elliptic, (7–)12–23 cm. long, (4–)6–12 cm. broad, narrowly rounded or subcordate at base, obtuse-cuspidate at apex, undulate-crenate at margin; inflorescence axillary, 1-flowered, the peduncle and pedicel subcontinuous, obscurely jointed, 15–25 mm. long; sepals 4 (or sometimes 3 by fusion of 2), 11–12 mm. long, 8–10 mm. broad, soon glabrous without, short-sericeous within; petals 4, papyraceous-subcoriaceous, 14–17 mm. long, 7–8 mm. broad; torus about 5 mm. in diameter, copiously hispidulous; stamens and staminodes very numerous (about 250–260), 5–6-seriate, 6–8 mm. long; staminodes about 90, linear-oblong, composed of a puberulent filament about 3 mm. long and a sterile glabrous body, sometimes lightly coherent laterally; stamens about 165, inside the staminodes, the filaments about 2 mm. long, glabrous or sparsely sericeous above, the anthers subacute, sericeous on both surfaces; ovary oblong-ellipsoid, 3- or 4-locular, setose with simple hairs about 0.6 mm. long and also copiously beset with shorter stouter hair-like processes, these 0.3–0.4 mm. long and copiously plumose toward apex; locules 10–14-ovulate; style subconical, 3–6 mm. long, deeply 4-fid, glabrous distally; fruit solitary, the combined peduncle and pedicel (obscurely jointed) 3–4.5 cm. long, stout (4–6 mm. in diameter); capsules oblong-ellipsoid, 5–7.5 cm. long, 4–5.5 cm. broad, 3- or 4-valved, the valves 2.5–3.5 cm. broad at base; pericarp woody, 7–12 mm. thick, covered without by innumerable stiff slender crowded subclavate bristles, these about 2 mm. long, plumose, irritant, at length deciduous, leaving the fruit-surface densely setose with stiff simple hairs or at length glabrescent and copiously pitted; seeds 6–16 per locule, angular-ellipsoid, 12–16 mm. long, 5–8 mm. broad, obtuse at base, rounded at apex, the aril completely investing the seed except for the hilar scar.

In presenting a brief re-description of *S. paradisearum*, Bailey (loc. cit.)

apparently based it in part upon Mueller's description and in part upon a specimen collected by Mrs. H. P. Schlencker at Boku, British New Guinea. The illustration doubtless portrays the latter plant and seems referable to *S. Brassii* rather than to Mueller's species. Lane-Poole (loc. cit.) also seems to have described *S. Brassii*, stating that his plant is "a common tree with a wide range around the lower altitudes of Papua from the plain to 2,000 feet." The description of the petioles as " $\frac{1}{2}$  to  $2\frac{1}{2}$  inches" and the leaf-blades as "undulate, . . . thin," indicates *S. Brassii* rather than *S. paradisearum*. Whether the latter species occurs beyond the Fly River basin remains to be ascertained.

*Sloanea* (§ *Cnidocarpaea*) *paradisearum* F. v. Muell. Pap. Pl. I: 84. 1877; Schlechter in Bot. Jahrb. 54: 148. 1916.

BRITISH NEW GUINEA: Fly River, 528-mile Camp, alt. 80 m., *Brass* 6822 (large tree with spur-buttressed base, in canopy-layer of ridge-forest; crown spreading, rather open; leaves glabrous, shining, the nerves prominent; fruits covered with irritant red hairs).

Apparently the above-cited Brass specimen is only the second collection which may be accurately referred to *S. paradisearum*, which is based on a collection by D'Albertis, also from the upper Fly River. F. M. Bailey and Lane-Poole have referred to this species plants from the eastern part of British New Guinea, which I believe are better placed in *S. Brassii*, as discussed above. The flowers of *S. paradisearum* are apparently still unknown. *Brass* 6822 agrees closely with the original description of Mueller's species, but certain details are in need of amplification, as follows:

Leaves glabrous in fruiting specimens or with a few obscure weak hairs on the petiole and the costa of lower leaf-surface; petioles slender, 6-18(-25) mm. long [2-3 lines ex Mueller]; leaf-blades chartaceous-subcoriaceous, green when dried, oblong-elliptic, (9-)13-20 cm. long, (4-)5-9 cm. broad, broadly obtuse or narrowly rounded at base, narrowed to a short obtuse acumen at apex, obscurely undulate or subentire at margin; fruit solitary on thickened peduncles, the combined peduncle and pedicel (obscurely jointed) 5-7 mm. in diameter and 6-7 cm. long; capsules oblong-ellipsoid, up to 10 cm. long and 6 cm. broad, 3- or 4-valved, the valves 3-4 cm. broad at base; pericarp 8-12 mm. thick, with indument similar to that described above for *S. Brassii* but with the bristles about 3 mm. long; seed 2-ranked, closely crowded, 14-20 per locule, essentially identical with those described above for *S. Brassii*.

In the absence of flowering material, comparison of this species with *S. Brassii* cannot be complete, but I believe that both species may be maintained. In comparison, *S. paradisearum* has shorter petioles, leaf-blades which remain green in drying and are slightly thicker in texture, more completely glabrescent petioles and nerves of the lower leaf-surface, and longer-peduncled and larger capsules, which have proportionately narrower valves, slightly longer spines, and more numerous seeds.

*Sloanea* (§ *Cnidocarpaea*) *myriandra* sp. nov.

Arbor, ramulis apicem versus gracilibus (2-3 mm. diametro) angulatis dense et molliter hirtellis, vetustioribus purpurascens glabratis striatis;

foliis suboppositis vel alternatis, petiolis gracilibus subteretibus 13–30 (vel ultra?) mm. longis ut ramulis hirtellis, laminis tenuibus papyraceis in sicco viridibus late ellipticis, 10–25 cm. longis, 6.5–15 cm. latis, basi late obtusis vel subrotundatis, apice breviter et obtuse cuspidatis, margine inconspicue undulatis subintegrisve, supra costa nervisque crispato-hirtellis exceptis glabris vel hinc inde inconspicue pilosis, subtus pilis pallidis 0.3–0.5 mm. longis molliter hirtellis, costa supra leviter elevata subtus prominente, nervis lateralibus utrinsecus 7–10 erecto-patentibus supra valde prominulis subtus elevatis, rete venularum intricato utrinque paullo prominulo; inflorescentiis axillaribus 1-floris, pedunculo (8–15 mm. longo) et pedicello (circiter 10 mm. longo crassiore) articulatis gracilibus dense puberulo-tomentellis; sepalis 4 (interdum 2 connatis) papyraceis ovato-ellipticis, 13–15 mm. longis, 7–10 mm. latis, subacutis, extus pallide puberulo-tomentellis, intus minute sericeo-puberulis et basim versus glabrescentibus; petalis 4 vel 5 textura sepalis similibus, elliptico-oblongis, 13–16 mm. longis, 6–8 mm. latis, subacutis, utrinque sericeo-puberulis, intus basim versus glabrescentibus; toro circiter 5 mm. lato minute hispidulo; staminibus staminodiisque numerosissimis (250–275) 5- vel 6-seriatis 6–7 mm. longis valde falcatis imbricatis; staminodiis 90–100 lineari-oblongis stipite obscure hispidulo 3–4 mm. longo excepto glabris; staminibus 160–180, filamentis carnosis complanatis 1–2 mm. longis subglabris, antheris dorso sericeo-hispidulis apiculo subglabro subacuto 1–2 mm. longo exeuntibus; ovario ovoideo-ellipsoideo 4-loculari leviter sulcato, processibus cylindricis circiter 0.2 mm. longis apicem versus dense plumosis copiose muricato, atque pilis simplicibus 0.3–0.5 mm. longis minute et dense setuloso, ovarii pariete crasso, loculis 10–12-ovulatis, stylo crasso conico 3–5 mm. longo, apicem versus vel fere ad basim 4-partito, basi hispidulo superne glabro.

NORTHEASTERN NEW GUINEA: Morobe District, Sattelberg, alt. 1000–1200 m., *Clemens 1048* (TYPE), Dec. 3, 1935.

This well-marked species is readily distinguished from its only close allies, *S. Brassii* (O. C. Schmidt) A. C. Sm. and *S. paradisearum* F. v. Muell., by its thin leaf-blades, which are soft-pilose beneath, and its copiously pubescent branchlets, petioles, peduncles, and pedicels. Its flowers closely resemble those of *S. Brassii* but have the stamens less copiously pubescent and the ovary-indument slightly closer.

#### § PACHYCARPAEA

*Sloanea* § *Pachycarpaea* sect. nov.

*Echinocarpus* sensu Schlechter in Bot. Jahrb. 54: 146, quoad spec. novo-guin. 1916; non Bl.

Sectio *Sloaneae* petalis latis, antheris aristatis, fructibus arcte pubescentibus non echinatis, seminibus apice et uno latere arillatis distinguitur. Arbores, inflorescentiis axillaribus breviter racemosis paucifloris; petalis quam sepalis majoribus, apice latis dentatisque; staminibus numerosis (plerumque 50–125) pluriseriatis, filamentis distinctis, antheris arista subulata conspicua exeuntibus; ovario pilis simplicibus velutino vel tomentello, 3–5 (raro 2-)-loculari, loculis 16–28-ovulatis, stylo elongato; capsulis magnis 3–5 (raro 2-)-valvatis, valvis crassis lignosis extus velutinis vel tomentellis non echinatis demum subglabrescentibus; seminibus plerumque 6–16 in quoque loculo, arillo crasso apicem seminis obtegente atque uno latere fere ad hilum extenso.

The sectional name refers to the thick-walled fruit; the differences between § *Pachycarpaea* and the other sections occurring in Papuasia are pointed out in the key above. Four already described species from New Guinea are here placed in § *Pachycarpaea*, to which number I add three more, one of them from the Solomon Islands. Whether this section extends beyond Papuasia is yet to be decided. *Sloanea Forbesii* F. v. Muell. is herewith designated as the type species of § *Pachycarpaea*.

From § *Echinocarpus*, the new section differs in its non-muricate ovary, its closely pubescent but non-echinate fruit, and the lateral extension of its aril; in § *Echinocarpus* the aril appears to cover only the apical portion of the seed. The fruits of § *Pachycarpaea* are so entirely different that the Papuan species can hardly logically be placed in § *Echinocarpus*. The new section differs from § *Phoenicospermum* in the form of its inflorescence, its broadened dentate petals, and its aril; in § *Phoenicospermum* the aril is presumably nearly complete, as in § *Anoniodes*. Superficially the fruits of § *Pachycarpaea* and § *Phoenicospermum* are similar, but the characters of the petals and the aril amply differentiate the sections.

From the preceding paragraph it is seen that § *Pachycarpaea* is more suggestive of both § *Echinocarpus* and § *Phoenicospermum* than it is of the Papuan sections *Anoniodes* and *Cnidocarpaea*. Its closest relative, however, is § *Antholoma*.

*Sloanea* (§ *Pachycarpaea*) *papuana* (Schlechter) comb. nov.

*Echinocarpus papuanus* Schlechter in Bot. Jahrb. 54: 148. 1916; White & Francis in Proc. Roy. Soc. Queensl. 39: 64. 1928.

NORTHEASTERN NEW GUINEA: Morobe District, alt. 750–2400 m., Sattelberg, *Clemens* 301 (tree 24–27 m. high, somewhat flanged at base, in hill-forest; trunk 30–60 cm. diam.; calyx cream-colored; petals pale green), *Clemens* 958 (tree 15–18 m. high, in marginal forest; trunk 30 cm. diam.); Yunzaing, *Clemens* 4100; Kaile to Sarawaket, *Clemens* 4924; vicinity of Wantoat, *Clemens* 11324 (tree, the trunk 30 cm. diam.; flowers pale greenish); Boana, *Clemens* 41551 (herb. Univ. Mich.), *Clemens* 41722 (large tree; trunk 45 cm. diam.; fruits dull yellow). NETHERLANDS NEW GUINEA: 6 km. southwest of Bernhard Camp, Idenburg River, alt. 1050 m., *Brass & Versteegh* 13109 (tree 32 m. high, occasional in primary forest on the slope of a ridge; trunk 51 cm. diam.; crown not wide-spreading; bark 12 mm. thick, brown; fruits red-brown).

The cited specimens appear to agree well with the original description of *Echinocarpus papuanus*, based on *Ledermann* 10315, "Im montanen Walde auf dem Lordberg, ca. 1000 m.," and the species has also been reported from Yunzaing by White and Francis. The specimens now available make desirable some amplification of the original description, as follows:

Petiole 1–3 cm. long; leaf-blades 8–19 cm. long, 4–11.5 cm. broad, glabrous but sometimes obscurely barbellate in axils of nerves beneath; inflorescences axillary, short-racemose, short-pedunculate, 2–4- or often only 1-flowered, the rachis to 3.5 cm. long but usually much shorter, the pedicels 8–25 mm. long; flowers either 4- or 5-merous; sepals 9–13 mm. long, 3.5–6 mm. broad; petals 14–20 mm. long, 6–12 mm. broad (rarely 6 in number, and then the sixth one very narrow), 6–9-dentate; torus about 6 mm. in diameter; stamens 55–75, about 3-seriate, 10–12 mm. long, the filaments short, 2–2.5 mm. long, the anthers (excl. awns) 3–4 mm. long, the awns 4–7 mm. long; ovary 3–5-locular, each locule about 16-ovulate,



the style 9–13 mm. long; capsules usually solitary, oblong-ellipsoid, 3–5 cm. long (to 6 cm. ex White & Francis), 2.5–3.5 cm. broad, 3–5-valved, the pericarp woody, 4–8 mm. thick, closely brown-tomentellous without; seeds usually 6–10 per locule, ellipsoid, 8–12 × 4–5 mm., the aril covering the distal one-third and extending down one side nearly to the hilum, the testa dark castaneous.

*Sloanea* (§ *Pachycarpaea*) *Forbesii* F. v. Muell. in Vict. Nat. 8: 164, nomen. 1892, in op. cit. 9: 111. 1892, in Jour. Bot. 31: 323. 1893; Bak. f. in Jour. Bot. 61: Suppl. 5. 1923.

*Echinocarpus Forbesii* Schlechter in Bot. Jahrb. 54: 148. 1916.

BRITISH NEW GUINEA: Central Division: Kanosia, alt. about 15 m., *Carr 11584* (NY) (tree about 21 m. high, on river-flats; flowers cream-colored); Mafulu, alt. 1250 m., *Brass 5399* (A, NY) (large tree, in lower primary forest; bark thick, lenticellate, pale brown; wood soft, pale; leaf-nerves pale, prominent on both sides; fruits pale brown; seeds brown-black, with red aril). NETHERLANDS NEW GUINEA: Bernhard Camp, Idenburg River, alt. 75 m., *Brass & Versteegh 14029* (tree 21 m. high, common in primary rain-forest of lower mountain slope; trunk 41 cm. diam.; crown not wide-spreading; bark 8 mm. thick, brown, fairly smooth; sap-wood white; heart-wood brown; flowers white); 4 km. southwest of Bernhard Camp, alt. 800 m., *Brass & Versteegh 13160* (tree 20 m. high, common in primary rain-forest on the flat plain; trunk 60 cm. diam.; crown not wide-spreading; bark 9 mm. thick, brown; wood yellow-brown; fruits brown).

Among the specimens available to me, those cited above agree best with the descriptions of *S. Forbesii*, based on *Forbes 273*, from Sogere. If my identification is correct, the leaf-pubesence is somewhat less obvious than implied by Schlechter, but it agrees fairly well with Mueller's description (1893) of "leaves . . . soon almost glabrous on the surface, puberulous beneath . . ." The following descriptive notes are based on the above-cited specimens:

Petiole usually 2–4 cm. long; leaf-blades 15–22(–30) cm. long, 9–15 cm. broad, often puberulent on nerves beneath and usually persistently barbellate in axils of nerves; inflorescences axillary, short-racemose, short-pedunculate, 2–5-flowered, the rachis 2–4 cm. long or sometimes shorter, the pedicels very slender in flower, 20–35 mm. long; flowers 4–6-merous; sepals 13–15 mm. long, 4–5 mm. broad; petals 22–25 mm. long, 13–16 mm. broad, 6–11-dentate; torus about 6 mm. in diameter; stamens about 100 [25–30 according to Mueller, surely an error, as the species of this relationship never have so few stamens], 4- or 5-seriate, 12–13 mm. long, the filaments 5–6 mm. long, the anthers (excl. awns) 3–3.5 mm. long, the awns 3.5–4 mm. long; ovary 3- or 4-(apparently rarely 2-)-locular, each locule 20–22-ovulate, the style 20–25 mm. long; capsules oblong-ellipsoid, 5–8.5 cm. long, 3.5–6.5 cm. broad, 3- or 4-(rarely 2-)-valved, the pericarp woody, 10–20 mm. thick, closely brown-velutinous without, eventually subglabrescent; seeds usually about 6–12 per locule, ellipsoid, 10–13 × 4–5 mm., the aril covering the distal quarter and extending down one side nearly to the hilum, the testa nigrescent.

From the above discussions of *S. papuana* and *S. Forbesii*, it is seen that the distinctions between them are less sharp than implied by Schlechter, that is, if my identifications are correct. However, it seems that the two species may be maintained, on the ground that *S. Forbesii* has larger leaf-blades on the average, with more persistent (but nevertheless inconspicu-

ous) hairs beneath, somewhat larger flowers, longer filaments, more numerous ovules, a longer style, and larger and much thicker-walled fruits.

*Brass & Versteegh 13160*, a fruiting specimen, agrees precisely with *Brass 5399*; *Brass & Versteegh 14029* bears immature flowers which are smaller than those of *Carr 11584* as to petals, stamens, and style, but which agree in all fundamental characters. Apparently the flowers expand rapidly after the bud opens, and measurements based on flowers which are not fully mature are unreliable.

*Sloanea* (§ *Pachycarpaea*) *aberrans* (Brandis) comb. nov.

*Elaeocarpus aberrans* Brandis in Kew Bull. 1899: 97. 1899.

BRITISH NEW GUINEA: Central Division, Dieni, Ononge Road, alt. 500 m., *Brass 3944* (A, NY) (tall tree with buttressed trunk and spreading crown, common in rain-forest; leaves paler beneath; flowers pale green).

The type of *Elaeocarpus aberrans* was collected on Mt. Scratchley, Central Division of British New Guinea, alt. 2000–4000 ft., by Giulianetti. The cited Brass collection agrees excellently with the original description, differing only in its more numerous stamens; this character may be variable or the original observation may have been inaccurate. The species is related to *S. papuana* (Schlechter) A. C. Sm., differing in having its leaf-blades more gradually narrowed to an attenuate base, its petals broader, and its ovules more numerous. Since the original description omits certain important points and dimensions, the following supplementary notes are offered:

Petiole 8–25 mm. long; leaf-blades (6–)9–15 cm. long, (3–)5–7 cm. broad, glabrous at anthesis; inflorescence axillary, short-racemose, (1–)2–6-flowered, the rachis up to 3 cm. long, the pedicels slender, 20–30 mm. long at anthesis; flowers usually 4-merous but sometimes 5-merous; sepals 10–12 mm. long, 5–6 mm. broad; petals 17–20 mm. long, 12–16 mm. broad, 7–14-dentate; torus 5–6 mm. broad; stamens 75–80 (50–60 ex Brandis), 10–11 mm. long, copiously hispidulous except for the glabrous awn, the filaments about 3 mm. long, the anthers (excl. awns) 3–4 mm. long, the awns 4–5 mm. long; ovary 3- or 4-locular, each locule 20–22-ovulate, the style 11–12 mm. long, sulcate.

Another specimen of this relationship, or possibly also representing the species, is *Clemens 376*, from Sattelberg, Morobe District, Northeastern New Guinea, alt. about 1050 m. (tree 30–38 m. high, in forest; trunk 60 cm. diam.; buds yellow-green). An exact comparison of this collection with *Brass 3944* is not satisfactory, as the Clemens plant bears only immature flowers. In foliage it seems similar to *S. aberrans*, although the leaves are somewhat smaller. Its immature petals are laterally connate into a corolla, but whether this feature persists at maturity (as in § *Antholoma*) remains to be seen; in this case the individuality of the petals is apparent. The locules are 24–26-ovulate.

*Sloanea* (§ *Pachycarpaea*) *gymnocarpa* sp. nov.

Arbor alta, ramulis apicem versus gracilibus (3–5 mm. diametro) rugulosis leviter angulatis pedicellisque minute brunneo-puberulis demum forsitan glabratis; foliis saepe oppositis interdum alternatis, petiolis robustis subteretibus 3–7 cm. longis apice valde incrassatis, laminis chartaceo-

coriaceis in sicco olivaceis late ellipticis, 13–22 cm. longis, 8–13 cm. latis, basi late obtusis vel rotundatis, apice obtuse et breviter cuspidatis raro subrotundatis, margine undulato-crenatis vel subintegris, utrinque glabris vel interdum subtus in axillis nervorum inconspicue barbellatis, costa utrinque prominente, nervis lateralibus utrinsecus 8–11 subpatentibus utrinque valde elevatis, rete venularum copioso utrinque leviter prominulo vel subplano; fructibus infra folia solitariis (vel interdum binis?), pedunculo sub fructu robusto (5–6 mm. diametro) glabro tereti 5–7 cm. longo, pedicellis sub fructu valde incrassatis (apice ad 10 mm. diametro) 2–2.5 cm. longis ut pedunculo glabro et ruguloso; capsulis ovato-ellipsoideis 4-angulatis maturitate 11–12 cm. longis et 6–7 cm. latis, 4-valvatis, valvis basi 3.5–6 cm. latis longitudinaliter conspicue sulcatis; pericarpio lignoso 13 (apice)–23 (basi) mm. crasso, extus indumento densissimo arcto brunneo-velutino induto demum subglabrescente et valde ruguloso, intus impressionibus seminum valde notato; seminibus in quoque loculo 10–16 ellipsoideis, 11–15 mm. longis, 4–5 mm. latis, basi acutis vel ad hilum cuspidatis, apice rotundatis, arillo conspicuo crasso quartam apicalem seminis obtegente atque uno latere fere ad hilum extenso, testa variegata.

BRITISH NEW GUINEA: Upper Fly River region, Palmer River, 2 miles below junction of Black River, alt. 100 m., *Brass 7259* (TYPE), July 1936 (tall spur-buttressed tree, common in river flood-bank forest; bark gray, lenticellate; fruit solitary on long peduncles below the leaves).

Although *S. gymnocarpa*, like *S. paradisearum* F. v. Muell., is known from the upper Fly River region, the two species are quite unlike in their fruit-indument and their arils, and they belong to different sections of the genus. *Sloanea gymnocarpa* further differs from Mueller's species in its longer-petioled leaves. Among the other species of § *Pachycarpaea*, *S. gymnocarpa* is most suggestive of *S. Forbesii* F. v. Muell. in its large leaves. It differs, however, in its longer petioles, its more completely glabrescent foliage, its obtuse or rounded but scarcely subcordate leaf-bases, and its even larger capsules. The aril- and seed-characters of the two species are essentially similar.

*Sloanea* (§ *Pachycarpaea*) *coriacea* Ridley in Trans. Linn. Soc. II. Bot. 9: 22. 1916.

Judging from the original description of *S. coriacea*, collected by the Wollaston Expedition along the Tsingarong River, alt. 3100 ft., south of Mt. Carstensz, Netherlands New Guinea, the species definitely belongs in § *Pachycarpaea*. It seems to be unrepresented in the material available to me, being suggestive, according to the description, of the species proposed below as *S. anacantha* and *S. insularis*.

*Sloanea* (§ *Pachycarpaea*) *anacantha* sp. nov.

Arbor grandis, ramulis gracilibus teretibus vel apicem versus angulatis glabris; foliis oppositis vel alternatis, petiolis leviter canaliculatis gracilibus glabris 1.5–2.5 cm. longis, laminis chartaceo-subcoriaceis in sicco fuscescentibus ovato-ellipticis, (6–)9–16 cm. longis, (3.5–)5–8 cm. latis, basi late obtusis vel subacutis, apice in acuminem breve obtusum interdum emarginatum angustatis, margine subintegris vel obscure undulatis, utrinque glabris raro subtus in axillis nervorum obscure barbellatis, costa supra elevata subtus prominente, nervis lateralibus utrinsecus 5–7 arcuatis supra

subplanis subtus elevatis, rete venularum intricato utrinque prominulo; inflorescentiis completis non visis sed ut videtur breviter racemosis paucifloris, pedicellis sub anthesi gracilibus glabris ad 33 mm. longis, sepalis petalisque 4 vel 5; sepalis carnosis deltoideo-lanceolatis, 14–17 mm. longis, 6–8 mm. latis, subacutis, extus glabris, intus et margine incrassato dense tomentellis; petalis submembranaceis oblongis, 26–28 mm. longis, 14–19 mm. latis, utrinque obscure puberulis glabrescentibus, apice 6–8-dentatis, lobis obtusis 2–3 mm. longis; toro carnoso complanato circiter 10 mm. lato; staminibus 90–100 circiter 5-seriatis 11–13 mm. longis ubique arista inclusa copiose hispidulis, filamentis carnosis teretibus 3–3.5 mm. longis, antheris arista subulata 4–5 mm. longa exclusa 3.5–4.5 mm. longis; ovario ovoideo angulato 4- vel 5-loculari et styli basi dense brunneo-tomentellis, ovarii pariete crasso intus puberulo, loculis circiter 28-ovulatis, stylo crasso subulato 10–12 mm. longo sulcato superne glabro; capsula unica visa oblongo-ellipsoidea 4-angulata, circiter 7.5 cm. longa et 4.5 cm. lata, 4-valvata, valvis basi 3–3.5 cm. latis longitudinaliter leviter sulcatis; pericarpio lignoso 13–16 mm. crasso, extus ruguloso et copiose arcte brunneo-velutino; seminibus paucis ut videtur 6–8 in quoque loculo ellipsoideis, 10–12 mm. longis, 5–6 mm. latis, basi subacutis, apice rotundatis, arillo crasso apicem seminis obtegente et uno latere fere ad hilum extenso, testa in sicco nigrescente nitida.

BRITISH NEW GUINEA: Central Division, Mafulu, alt. 1250 m., *Brass 5510* (A, TYPE, NY), Nov. 16, 1933 (large tree, with narrow flange-like buttress-roots, in tall forest of lower levels; bark pale brown; leaves smooth, dark; flowers yellow; fruit brown, with red seeds).

*Sloanea anacantha*, a species characterized by having its leaf-blades acute to obtuse at both ends, with the veinlet-reticulation intricate and prominulous, is probably most closely allied to *S. coriacea* Ridley. It differs from this in having its leaves averaging smaller and with fewer secondaries, in its larger flowers, and in its glabrous pedicels and outer surface of sepals. The last character distinguishes the new species from all the other known Papuan members of § *Pachycarpaea*, in which the pedicels and the outer surfaces of the sepals are persistently pubescent past anthesis.

*Sloanea* (§ *Pachycarpaea*) *insularis* sp. nov.

Arbor ad 30 m. alta, ramulis subteretibus rugulosis apicem versus 2–5 mm. diametro mox glabratis; foliis oppositis vel alternatis, petiolis glabratis gracilibus subteretibus 1–3 cm. longis apice incrassatis, laminis chartaceo-subcoriaceis fuscescentibus ovato-ellipticis, (8–)12–19 cm. longis, (4.5–)6–9 cm. latis, basi late obtusis vel anguste rotundatis, apice in acuminem ad 1 cm. longum obtusum angustatis, margine undulato-crenatis vel subintegris, utrinque glabris vel subtus costa nervisque evanescenter puberulis, costa supra paullo elevata subtus prominente, nervis lateralibus utrinsecus 6–10 erecto-patentibus supra leviter subtus valde elevatis, rete venularum intricato utrinque plano vel inconspicue prominulo; inflorescentiis axillari-bus breviter racemosis (1–)2–4-floris, pedunculo brevi, rhachi ad 1.5 cm. longa gracili pedicellisque cano-puberulis, pedicellis sub anthesi gracilibus 15–28 mm. longis sub fructu valde incrassatis; sepalis 5 vel 6 subcoriaceis ovato-oblongis, 12–13 mm. longis, 4–6 mm. latis, subacutis, utrinque puberulo-tomentellis, interdum plus minusve connatis; petalis 5 vel 6 (interdum ad 8 angustioribus paucidentatis) submembranaceis oblongis,

16–18 mm. longis, 10–11 mm. latis, utrinque pallido-puberulis subglabris, apice plerumque 7–10-dentatis, lobis deltoideo-oblongis obtusis circiter 2 mm. longis; toro complanato circiter 7 mm. lato minute velutino; staminibus 85–125 circiter 4- vel 5-seriatis 12–13 mm. longis ubique arista glabra excepta minute hispidulis, filamentis gracilibus subteretibus 5.5–6.5 mm. longis, antheris arista subulata 2–3 mm. longa exclusa 4–4.5 mm. longis; ovario ovoideo leviter angulato 3- vel 4-loculari et stylo basim versus brunneo-velutinis, ovarii pariete crasso intus subhirsuto, loculis 18–22-ovulatis, stylo crasso subulato circiter 18 mm. longo sulcato superne glabro; capsula unica visa ellipsoidea leviter angulata, ad 5.5 cm. longa et 3.5 cm. lata, 4- vel forsitan 3-valvata, valvis basi circiter 2.5 cm. latis; pericarpio lignoso 8–12 mm. crasso, extus dense et arcte velutino; seminibus paucis ellipsoideis, circiter 12 × 5 mm., basi obtusis, apice rotundatis, arillo apicem seminis obtegente et uno latere fere ad hilum extenso, testa in sicco atro-castanea nitida.

SOLOMON ISLANDS: Bougainville: Koniguru, Buin, alt. 1200 m., *Kajewski* 2127 (TYPE), Aug. 20, 1930 (tree up to 30 m. high, common in rain-forest; sepals bright cream-green; fruit light green; native name: *twino*; timber said to be very durable; sap used by natives as source of a black dye); Siwai, *Waterhouse* 97 (NY) (tree about 25 m. high; native names: *kuinotui*, *tugtuqini*); Guadalcanal: Uulolo, Tutuve Mt., alt. 1200 m., *Kajewski* 2594 (tree to 20 m. high, common in rain-forest; bark mottled).

In the shape of its leaves, *S. insularis* suggests *S. coriacea* Ridley and *S. anacantha* (above described). It differs from *S. anacantha* in its pubescent pedicels and sepals and its less obvious veinlet-reticulation, as well as in minor floral details, such as its presumably smaller petals, longer filaments, longer style, and fewer ovules. The original description of *S. coriacea* does not permit a very accurate comparison of *S. insularis* with it, but apparently the Solomon Islands species differs at least in its less obvious venation, slightly larger flowers, and longer filaments.

This species extends the known range of *Sloanea* into the Solomon Islands. Of the above-cited specimens, *Waterhouse* 97 has the only mature flowers, from which the stated dimensions are taken. The type has young flowers and a single mature fruit, while *Kajewski* 2594 has very young fruits.

#### § ANTHOLOMA

*Sloanea* § *Antholoma* (Labill.) comb. nov.

*Antholoma* Labill. Rel. Voy. Rech. Pérouse 2: 235. *pl.* 41. 1800, Nov. Holl. Pl. Sp. 2: 121. 1806; Choisy in DC. Prodr. 1: 565. 1824; Endl. Gen. Pl. 1030. 1840; Planch. in Ann. Sci. Nat. IV. 2: 260. 1854; Baill. in Adansonia 2: 21. *pl.* 1. 1861; Benth. & Hook. f. Gen. Pl. 1: 239. 1862; Vieill. in Bull. Soc. Linn. Normand. 9: 334. 1865; K. Schum. in E. & P. Nat. Pfl. III. 6: 7. 1890; Schlechter in Bot. Jahrb. 54: 154. 1916; O. C. Schmidt in Nova Guin. Bot. 14: 155. 1924.

In describing the genus *Antholoma*, based on the New Caledonian *A. montana*, Labillardière did not refer it to a family. Choisy, in 1824, unaccountably referred the genus to the Marcgraviaceae, in which he was followed by Endlicher. Planchon, in 1854, was apparently the first properly to place *Antholoma* in the "Tiliacées-Elaeocarpées." In this he was followed by Baillon, in 1861, and Bentham (in Jour. Linn. Soc. 6: 123. 1862), who states that *Antholoma* "is indeed closely allied to *Sloanea*,

differing chiefly in the petals united into a tubular, almost conical corolla." Bentham thus repudiated his earlier suggestion (in op. cit. 5: Suppl. 2: 74. 1861) that the genus was nearer the Sapotaceae than the Tiliaceae.

Apparently no student of the group has thus far questioned the generic status of *Antholoma*, now known from three New Caledonian and two New Guinean species, although its close affinity to *Sloanea* has been generally recognized. The Archbold Expeditions have added nine collections to *Antholoma*, previously reported from New Guinea from only three collections. Therefore a more careful consideration of the genus is now possible, and it becomes evident that the only important generic character which separates it from *Sloanea*, the presence of a corolla of fused petals, is not constant. In various species the corolla is sometimes split to the base on one side, while in *Sloanea Archboldiana* (described below) the corolla, although superficially gamopetalous and characteristically plicate, often consists of two to four entirely distinct petals of various widths. In all other fundamental characters, *Antholoma* resembles *Sloanea* § *Pachycarpaea*, in which, as a matter of fact, the petals are occasionally loosely connate. A gradual transition between *Antholoma* and *Sloanea* is thus established, and it seems unwise to retain Labillardière's genus as distinct.

In characters pertaining to the seed, a slight difference between § *Antholoma* and § *Pachycarpaea* is discernible. In the latter section, the aril is thick and waxy, even when dried, and the lateral flange tapers very gradually toward the hilum. In § *Antholoma*, the aril becomes thin and papery when dried, and the lateral flange tapers more abruptly, being essentially triangular. Furthermore, the testa of § *Antholoma* appears to be thinner and more brittle than that of § *Pachycarpaea*.

The two groups proposed in *Antholoma* by Schmidt (loc. cit.), *Papuanæ* and *Montanæ*, are not very satisfactory as a basis for separating the New Guinean and the New Caledonian<sup>1</sup> species of this alliance. In its solitary flowers, for instance, *Sloanea haplopoda* agrees with the New Guinean rather than the New Caledonian species and thus provides a transition, since its entire long-petiolate leaves suggest the other New Caledonian species. Some of the New Guinean species also have scarcely dentate leaves, and the number of ovary-locules is not of primary importance. The section, as it includes both New Caledonian and New Guinean representatives, seems very coherent and perhaps not in need of further division.

Below I propose three new species of § *Antholoma*, which is therefore now represented by eight species, of which five are New Guinean.

<sup>1</sup>In view of the proposed reduction of *Antholoma* to *Sloanea*, it seems advisable to record the three new combinations which are necessary for the New Caledonian species:  
*Sloanea* (§ *Antholoma*) *montana* (Labill.) comb. nov.

*Antholoma montana* Labill. Rel. Voy. Rech. Pérouse 2: 236. pl. 41. 1800, Nov. Holl. Pl. Sp. 2: 122. 1806; Vieill. in Bull. Soc. Linn. Normand. 9: 335. 1865.

*Sloanea* (§ *Antholoma*) *Billardieri* (Vieill.) comb. nov.

*Antholoma Billardieri* Vieill. in Bull. Soc. Linn. Normand. 9: 335. 1865.

*Sloanea* (§ *Antholoma*) *haplopoda* (Guillaumin) comb. nov.

*Antholoma haplopoda* Guillaumin in Bull. Mus. Hist. Nat. Paris 26: 259. 1920.

*Sloanea* (§ *Antholoma*) *Tieghemi* (F. v. Muell.) comb. nov.

*Antholoma Tieghemi* F. v. Muell. in Vict. Nat. 8: 164, nomen. 1892, in op. cit. 9: 111. 1892, in Jour. Bot. 31: 322. 1893; Schlechter in Bot. Jahrb. 54: 155. 1916; Lane-Poole, Rep. For. Res. Papua 110. 1925; White & Francis in Proc. Roy. Soc. Queensl. 38: 239. 1927.

BRITISH NEW GUINEA: Central Division, Mt. Tafa, alt. 2400 m., *Brass 5064* (A, NY) (bush 1–2 m. high, with upright branching habit, common on old landslips; leaves rather stiff, shining above; corolla pale yellow-green).

*Antholoma Tieghemi*, based on a collection made near the summit of Mt. Yule (not far from Mt. Tafa, with an elevation exceeding 3000 m.), was originally described "from very fragmentary material." In view of this, too close an agreement between Mueller's descriptions and *Brass 5064* is perhaps not to be expected. However, our specimen agrees with Mueller's plant in the essential details, apparently differing in its usually larger leaves (interspersed with leaves only 2–3 inches long, as described for *Antholoma Tieghemi*), slightly longer sepals and corolla, stamens nearly twice as long and more numerous ("60–70" ex Mueller), and larger fruits and seeds. In spite of these differences, it seems most likely that the *Brass* collection represents Mueller's species. It also seems probable that *Lane-Poole 370*, collected in the Owen Stanley Range at 6000 ft. and briefly discussed by Lane-Poole and White and Francis, represents the same species as *Brass 5064*. A description based entirely on *Brass 5064* is given below.

Low shrub, the young branchlets and leaves copiously brown-floccose-tomentellous, soon glabrescent, the branchlets slender, angled and 2–3 mm. in diameter distally; leaves alternate, the petioles slender, subterete, 1–2.5 cm. long, the blades subcoriaceous or sometimes papyraceous, greenish or olivaceous when dried, elliptic, diverse in size, 6–15 cm. long, 3–10 cm. broad, broadly obtuse or rounded at base, abruptly cuspidate at apex with a callose-apiculate tip up to 1 cm. long, remotely but conspicuously spinulose-serrate at margins, the costa and the 4–7 lateral nerves raised above and prominent beneath, the veinlet-reticulation intricate and prominulous on both surfaces; inflorescences axillary, usually 1-flowered, the peduncle and pedicel subcontinuous, articulate, slender, 3–4 cm. long, at first tomentellous, glabrate in fruit; sepals 4 (2 sometimes fused), carnose-coriaceous, deltoid-oblong, 15–18 mm. long, 7–10 mm. broad, subacute, closely puberulent-tomentellous on both surfaces; petals completely fused into a submembranaceous campanulate corolla, this puberulent-tomentellous on both sides, soon glabrescent distally, copiously longitudinally nerved and plicate distally, 30–40 mm. long at anthesis, 7–12 mm. broad at base, flaring to 25–35 mm. at apex, copiously dentate, the teeth deltoid, 2–3 mm. long and broad, subacute; torus thick-carnose, flattened, about 10 mm. broad, rugose, copiously velutinous; stamens 90–100, about 4-seriate, erect, hispidulous throughout, 13–14 mm. long, the filaments slender, subterete, about 5 mm. long, the anther-locules 4.5–6 mm. long, the awns subulate, 3–3.5 mm. long; ovary triquetrous-ellipsoid, sharply angled, 3-locular (probably sometimes 2-locular), copiously velutinous, the locules about 18-ovulate, the style subulate, sulcate, about 25 mm. long, at length deeply 3-fid; capsules narrowly triquetrous-ellipsoid and 3-valved (or somewhat flattened and 2-valved), 3.5–5.5 cm. long, 2–2.5 cm. broad, the pericarp 4–6 mm. thick, rugulose and eventually glabrate without; seeds few, some-

times only 1 per locule, ellipsoid, 13–15 mm. long, 7–8 mm. broad, subacute at base, rounded at apex, the aril thin, papery when dried, covering the distal  $\frac{1}{3}$  to  $\frac{1}{2}$  and sinuate-margined, extending down one side in a narrowing strip nearly to the hilum, the testa castaneous, shining, very thin and brittle.

*Sloanea* (§ *Antholoma*) *Lamii* nom. nov.

*Antholoma papuana* O. C. Schmidt in Nova Guin. Bot. 14: 155. t. 17. 1924; non *Sloanea papuana* A. C. Sm. [*Echinocarpus papuanus* Schlechter].

From the description and the excellent plate, this species seems to be unrepresented in the collections of the Archbold Expeditions. It is based on *Lam* 1930, "Bivak auf dem Rücken des Doorman-Massives in 2480 m. Höhe," Netherlands New Guinea. *Sloanea Lamii* most nearly suggests *Brass* 5064, which I have above referred to *S. Tieghemi*, and Schmidt's species would indeed appear to be close to Mueller's, at least as I have interpreted this. It can probably be distinguished, however, by its longer leaf-acumen, much longer sepals (28–30 mm. long), and shorter-awned anthers. In the description of *Antholoma papuana* the stamens are said to be glabrous, but on the plate they are shown as copiously setulose, and this is doubtless correct.

*Sloanea* (§ *Antholoma*) *Archboldiana* sp. nov.

Arbor ad 15 m. alta, partibus juvenilibus omnino copiose fulvo-floccosotomentellis mox subglabrescentibus, ramulis subteretibus vel superne angulatis et 2–3 mm. diametro; foliis oppositis vel alternatis, petiolis gracilibus supra leviter canaliculatis 5–25 mm. longis, laminis chartaceo-subcoriaceis in sicco fuscescentibus ellipticis vel obovato-ellipticis, 4–11 cm. longis, 2.5–6 cm. latis, basi subacutis vel late obtusis, apice obtusis vel in acuminem obtusum ad 5 mm. longum abrupte angustatis, margine undulatis vel remote calloso-crenulatis, maturitate glabris vel subtus dispersim floccoso-puberulis et interdum in axillis nervorum persistenter barbellatis, costa supra leviter elevata subtus prominente, nervis lateralibus utrinsecus 4–7 erecto-patentibus anastomosantibus supra paullo subtus valde elevatis, rete venularum intricato utrinque prominulo vel subimmerso; inflorescentiis axillaribus 1 (raro 2-) -floris, pedunculo brevi et pedicello gracili sub anthesi ad 4 cm. longo obscure articulatis primo tomentello-puberulis sub fructu glabratis; bracteis pedicelli paucis mox caducis, eis apice sub calyce plus minusve persistentibus, majoribus 1 vel 2 lanceolatis vel spathulatis ad 11 × 2.5 mm. tomentellis, minoribus 1–4 inconspicuis; sepalis 4 vel 5 (2 interdum connatis) carnosio-subcoriaceis ovato-oblongis, 14–20 mm. longis, 6–12 mm. latis, subacutis, margine incrassatis, utrinque dense brunneo-tomentellis; petalis in corollam interdum connatis, interdum 2 aequalibus latissimis, interdum 3 vel 4 et latitudine valde inaequalibus; corolla submembranacea 28–35 mm. longa apice ad 45 mm. diametro, utrinque puberula apicem versus glabrata et plicata, apice copiose dentata, lobis deltoideo-oblongis obtusis 2–4 mm. longis; toro carnosio circiter 7 mm. diametro dense brunneo-velutino; staminibus 75–100 plerumque 4- vel 5-seriatis maturitate 10–12 mm. longis ubique praeter aristae apicem dense hispidulis, filamentis gracilibus subteretibus 3–4 mm. longis, antheris arista subulata 2.5–4 mm. longa excepta 4–5.5 mm. longis; ovario 3- vel 4- vel raro forsan 2-loculari angulato et styli basi dense brunneo-velutinis, ovarii pariete crasso, loculis



16–20-ovulatis, stylo subulato 16–20 mm. longo sulcato vel angulato sub-integro; pedunculo et pedicello sub fructu subcontinuis valde incrassatis, capsulis ellipsoideis maturitate (3.5–)5–7.5 cm. longis et 2.5–4 cm. latis, 3- vel 4- vel raro 2-valvatis (valvis 2 in fructibus sterilibus solis visis), pericarpio lignoso 8–13 mm. crasso ruguloso et dense velutino demum glabrescente; seminibus 6–12 in quoque loculo obovoideis, 8–11 mm. longis, 4–6 mm. latis, basi subacutis, apice rotundatis, arillo tenui in sicco papyraceo quartam apicalem seminis obtegente sinuato-marginato atque uno latere fere ad hilum extenso, testa atro-castanea nitida tenui.

NETHERLANDS NEW GUINEA: Balim River, alt. 1600 m., *Brass & Versteegh 11174* (tree 8 m. high, frequent in relic forest on rocky banks of river; trunk 25 cm. diam.; crown small; bark 8 mm. thick, black, fairly rough; flowers yellow-green), *Brass 11837* (TYPE), Dec. 1938 (tree 7–8 m. high, common in relic forest on rocky banks of river; flowers yellow); Bele River, 18 km. northeast of Lake Habbema, alt. 2200–2300 m., *Brass & Versteegh 11130* (tree 13 m. high, frequent in old secondary forest; trunk 40 cm. diam.; crown not wide-spreading; bark 4 mm. thick, brown, rough; wood white; flowers yellow-green; fruits brown-green), *Brass 11217* (tree up to 15 m. high, common in old secondary forest; fruits brown, the seeds black, with orange-red aril); Arfak Mts., Angi, in the spinneys by Lake Gita, alt. 1900 m., *Kanehira & Hatusima 13675* (tree 8 m. high).

The type collection bears mature flowers, from which the above dimensions are taken, and also fruits; the latter are probably not typical for the species, being comparatively narrow, often 2-valved, and completely sterile. More normal fruits are associated with nos. 11130 and 11217, while an old fruit accompanies *Kanehira & Hatusima 13675*. Younger flowers are borne by no. 11174 and a few old flowers by no. 11130.

The new species is readily distinguished from the two thus far described from New Guinea in § *Antholoma*, *S. Tieghemi* (F. v. Muell.) A. C. Sm. and *S. Lamii* A. C. Sm., by its consistently smaller leaves with undulate-crenate or subentire, rather than spinulose-serrate, margins, and with less conspicuously cuspidate apices. In floral characters, *S. Archboldiana* is hardly distinguishable from its allies, although the corolla is often split down one side or variously divided into 2–4 petals. This fact, while of no specific consequence (all extremes being found on one plant), bridges the most significant difference between *Antholoma* and *Sloanea* § *Pachycarpaea*.

*Sloanea* (§ *Antholoma*) *perbella* sp. nov.

Arbor ad 28 m. alta multiramosa, ramulis gracilibus, ultimis brevibus angulatis 1–2 mm. diametro ferrugineo-tomentellis, vetustioribus subteretibus cinereis glabratis; foliis alternatis vel suboppositis, petiolis gracilibus supra complanatis 4–16 mm. longis, laminis coriaceis fuscescentibus angulato-ellipticis, 2.5–5.5 cm. longis, 1.5–3 cm. latis, basi acutis vel late obtusis, apice in acuminem obtusum 3–7 mm. longum cuspidatis, margine remote calloso-crenatis vel conspicue undulatis, maturitate supra glabris subtus indumento crispo-ferrugineo-tomentello dense et persistenter obtectis, costa supra acute elevata subtus prominente, nervis lateralibus utrinsecus 3–5 patentibus supra valde prominulis subtus elevatis, rete venularum intricato supra prominulo vel immerso subtus indumento occulto; inflorescentiis axillaribus unifloris, pedunculo brevi et pedicello subcontinuis sub anthesi dense tomentello-puberulis, pedicellis 8–12 mm. longis bracteis paucis linearibus mox caducis apicem versus ornatis; sepalis 5 vel 6 (2 interdum con-

natis) carnosio-subcoriaceis deltoideo-lanceolatis, 13–15 mm. longis, 4–7 mm. latis, subacutis, utrinque puberulo-tomentellis; petalis in corollam campanulatam interdum uno latere ad basim fissam connatis, corolla papyraceo-submembranacea utrinque dense puberula sub anthesi 18–22 mm. longa et apice 13–17 mm. diametro (matura?), apicem versus plicata, apice copiose dentata, lobis oblongo-lanceolatis subacutis 2–3 mm. longis; toro 6–7 mm. lato minute velutino; staminibus circiter 50 plerumque 3-seriatis 9–10 mm. longis (submaturis) ubique minute hispidulis, filamentis crassis teretibus 2–2.5 mm. longis, antheris arista subulata 3–3.5 mm. longa excepta 4–5 mm. longis; ovario ovoideo angulato 3-loculari (an semper?) et styli basi dense brunneo-velutinis, loculis 12–14-ovulatis, stylo crasso-subulato 8–9 mm. longo sulcato superne glabro; pedunculo et pedicello sub fructu incrassatis subcontinuis ad 3 cm. longis, capsulis ellipsoideis maturitate ad 5 × 2.5 cm., 3-valvatis, valvis circiter 2 cm. latis dorso leviter sulcatis, pericarpio lignoso 4–7 mm. crasso ruguloso dense velutino demum glabrato; seminibus ut videtur paucis, modo sectionis arillatis.

NETHERLANDS NEW GUINEA: 18 km. southwest of Bernhard Camp, Idenburg River, alt. 2150–2200 m., *Brass & Versteegh 11990* (tree 28 m. high, frequent in primary forest on a ridge; trunk 43 cm. diam.; crown not wide-spreading; bark 9 mm. thick, gray, fairly smooth; wood yellow-brown; flowers green-yellow; fruits red-brown), *Brass 12710* (TYPE), Feb. 1939 (tree up to 25 m. high, plentiful on upper slopes of the ridges in mossy-forest; trunk 50 cm. diam.; flowers greenish yellow).

*Sloanea perbella* is readily distinguished from its allies by its small few-nerved leaves, which are persistently ferruginous-tomentellous beneath and somewhat angular in outline. The flowers are comparatively small, but this is not a very reliable character in § *Antholoma*, where the corolla and stamens elongate rapidly in maturing flowers. The comparatively small number of stamens and ovules is perhaps a more dependable feature.

The type bears flowers and mature fruits, while no. 11990 has a few flower-buds and fruits. Only one seed has been seen, and this, although imperfectly developed, has the thin partial aril characteristic of the section.

*Sloanea* (§ *Antholoma*) *Versteeghii* sp. nov.

Arbor ad 26 m. alta, partibus juvenilibus omnino copiose fulvo-squarrosotomentellis mox glabrescentibus, ramulis apicem versus conspicue complanatis 3–5 mm. latis, vetustioribus subteretibus cinereis; foliis oppositis vel alternatis, petiolis validis subteretibus vel leviter canaliculatis 6–20 mm. longis ut ramulis tomentellis mox glabratis, laminis coriaceis vel subcoriaceis fuscescentibus ellipticis, (7–)12–21 cm. longis, (4–)5–10 cm. latis, basi late obtusis vel subrotundatis, apice obtusis, margine integris vel haud undulatis, maturitate utrinque glabris vel subtus costa nervisque farinoso-puberulis, costa supra elevata subtus valde prominente, nervis lateralibus utrinsecus 6–10 subrectis adscendentibus supra leviter subtus valde elevatis, rete venularum copioso utrinque prominulo vel subplano; inflorescentiis axillaribus unifloris, pedunculo et pedicello subcontinuis circiter 1.5 mm. longis validis sub anthesi puberulis demum glabratis, bracteis pedicelli paucis dense puberulis mox caducis, eis medium versus spatulatis ad 10 mm. longis, eis apicis lanceolatis 4–5 mm. longis; sepalis 4 carnosio-subcoriaceis lanceolato-oblongis, 17–21 mm. longis, 5–6 mm. latis, subacutis, utrinque copiose puberulo-velutinis; petalis in corollam siccitate sub-

membranaceam campanulatam connatis, corolla 27–30 mm. longa, apice circiter 25 mm. diametro, utrinque pallido-puberula, superne plicata, apice copiose dentata, lobis subacutis deltoideo-oblongis circiter  $3 \times 2$  mm.; toro carnosio circiter 7 mm. diametro dense velutino; staminibus ut videtur circiter 70 plerumque 3-seriatis 11–12 mm. longis ubique copiose hispidulis, filamentis crassis subteretibus 3–3.5 mm. longis, antheris arista subulata loculos subaequante excepta 3.5–5 mm. longis; ovario acute angulato 3-vel 4-loculari et styli basi arcte brunneo-velutinis, loculis circiter 20-ovulatis, stylo crasso-subulato sulcato circiter 15 mm. longo; pedicellis sub fructu incrassatis ad 2 cm. longis, capsulis ellipsoideis ad  $5 \times 3$  cm. 3-vel 4-valvatis, pericarpio lignoso 5–9 mm. crasso ruguloso velutino; seminibus in quoque loculo circiter 8 ellipsoideis, 9–10 mm. longis, 5–6 mm. latis, basi subacutis, apice rotundatis, arillo modo sectionis tenui apicali atque uno latere fere ad hilum extenso, testa atro-castanea nitida.

NETHERLANDS NEW GUINEA: 6 km. southwest of Bernhard Camp, Idenburg River, alt. 1500 m., *Brass & Versteegh 12514* (TYPE), Feb. 12, 1939 (tree 26 m. high, occasional in forest of the slopes; trunk 45 cm. diam.; crown not wide-spreading; bark 5 mm. thick, gray; sap-wood light brown; heart-wood brown; flowers green-yellow; fruits brown-green).

*Sloanea Versteeghii* differs from its similarly large-leaved New Guinean congeners, *S. Tieghemi* (F. v. Muell.) A. C. Sm. and *S. Lamii* A. C. Sm., in its coriaceous and essentially entire-margined leaf-blades, which are obtuse or nearly so at the apex, rather than cuspidate-acuminate, and which have more numerous secondaries; the combined peduncle and pedicel of the new species is comparatively short.

It is probable that *Brass & Versteegh 13503* (2 km. southwest of Bernhard Camp, alt. 800 m.) also represents *S. Versteeghii*, although it differs from the type in its spreading rather than suberect secondaries. This specimen is accompanied by mature fruits, which are up to  $8 \times 5$  cm., with a pericarp 7–15 mm. thick and seeds similar to those described above. A more complete series of specimens is desirable to indicate the variation within the species.

#### SUMMARY

In the preceding pages 60 Papuasian species of Elaeocarpaceae have been described as new, for the most part based upon the collections of the Archbold Expeditions. The new species are distributed in five genera as follows: *Sericolea* 5, *Aceratium* 9, *Elaeocarpus* 32, *Dubouzetia* 2, and *Sloanea* 12. Previously the family had been represented in our region by about 127 described species, of which all but a very few appear maintainable. Thus about 187 species of Elaeocarpaceae are now known from Papuasia, more than double the number known to Schlechter in 1916. A key to the genera occurring in Papuasia follows:

Stamens inserted within the disk or at its upper margin, the disk-surface free of stamens; anthers transversely dehiscent at apex, the clefts sometimes extending downward laterally; fruit various, but not a completely loculidically dehiscent capsule, the seeds not arillate.

Fruit a berry, the pericarp thin when dried, with inconspicuous mesocarp and endocarp; slender plants, often epiphytic; leaves opposite or subopposite; petals with the apex rounded, truncate, undulate, or 2- or 3-lobed; disk lobed, with the lobes often spreading, or rarely subcontinuous; stamens 10–15, not awned. . . *Sericolea*.

- Fruit a drupe, the pericarp thick, with pulpy or fibrous mesocarp and bony endocarp; plants comparatively robust, not or rarely epiphytic; petals various, often copiously fimbriate, sometimes entire; disk annular-pulvinate or with fleshy lobes.
- Leaves opposite or subopposite; petals dentate at apex, the margins toward base often laterally coherent by means of a tangled tomentum; stamens usually 15, rarely 12 or up to 20, not awned; fruits usually conical-ellipsoid, the pericarp often irregularly fissured, disclosing the thick fibrous mesocarp, which is firmly adherent to the endocarp.....*Aceratium*.
- Leaves alternate, very rarely opposite (in Papuasia only in *E. sericoloides*); stamens indefinite, usually numerous, the clefts often extending downward laterally, one lip often awned; fruit usually ellipsoid to subglobose, the mesocarp pulpy or sometimes fibrous, at length usually free from the endocarp, which is sometimes conspicuously ornamented.....*Elaeocarpus*.
- Fruit a capsule, at first imperfectly loculicidally dehiscent, finally completely septidally dehiscent and separating into open cocci, the seeds conspicuously strophiolate; leaves alternate; petals involute and often subcoherent toward base, inconspicuously denticulate at apex; disk with carnose lobes; stamens 20-40, not awned, the anthers dehiscing by a small apical 2-lipped pore.....*Dubouzetia*.
- Stamens inserted on the broad flattened disk-like surface of the torus; anthers dehiscing laterally, the clefts elongate but not extending across the apex, which is continued into a single short mucro or subulate awn; fruit a loculicidally dehiscent capsule, the seeds arillate.....*Sloanea*.

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